DOCUMENT RESUME

ED 062 177 SE 013 640

TITLE	Authorized Course of Instruction for the Quinmester Program. Science: Introduction to Anatomy and Physiology; Human Reproduction; Man and Disease; Man's Senses; and Introduction to the Human Body.
INSTITUTION	Dade County Public Schools, Miami, Fla.
PUB DATE	71
NOTE	96p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Bibliographies; *Biology; Films; *Instruction; Laboratory Procedures; *Objectives; *Physiology; Secondary School Science; *Teaching Guides; Units of Study (Subject Fields)
IDENTIFIERS	Quinmester Program

ABSTRACT

Performance objectives are stated for each of the five secondary school units included in this package of instructional guides prepared for the Dade County Florida Quinmester Program. All five units are concerned with aspects of physiology; three require no prerequisite study of biology ("Introduction to the Human Body," "Man and Disease," and "Man's Senses"), but two assume a minimal biology background ("Introduction to Anatomy and Physiology," and "Human Reproduction"). Each booklet contains a brief course outline, a list of relevant state-adopted textbooks, additional references, a catalog of visual aids available from the county visual aids center, and a list of experiments, demonstrations, and projects suitable for student and teacher use. Few experimental details are given, but reference is made to the appropriate pages in textbooks or teacher's sourcebooks. Some original projects are described in some of the booklets. A master sheet relating each of the suggested activities to the stated objectives is appended to each unit. (AL)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

DADE COUNTY PUBLIC SCHOOLS

Science: INTRODUCTION TO ANATOMY AND PHYSIOLOGY 5363.01
5346.01

DIVISION OF INSTRUCTION • 1971

INTRODUCTION TO ANATOMY AND PHYSIOLOGY

5363.01
5346.01

SCIENCE
(Experimental)

Written by
Alan Weiss, Richard Petty
and Peter Saponaro
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Fla.
1971

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Price: $.75

AN INTRODUCTION TO ANATOMY AND PHYSIOLOGY

COURSE DESCRIPTION:

An introductory course in anatomy and physiology providing an in-depth study of cells and tissues, the skeleton, muscle structure and muscle physiology.

ENROLLMENT GUIDELINES:

This course is for the serious student in biology. It is especially recommended for students interested in a vocation in nursing, medical technology, dental hygiene or other para-medical areas. It should follow credit or background in previous biology programs and is, in part, a second course in biology.

STATE ADOPTED TEXTS

1. Morrison, Cornett, Tether, Gratz. Experiments in Physiology. New York: Holt, Rinehart, and Winston Inc., 1967.

2. Morrison, Cornett, Tether, Gratz. Human Physiology. New York: Holt, Rinehart, and Winston Inc., 1967.

PERFORMANCE OBJECTIVES

The student will:

1. Define the following terms: anatomy, physiology cytology, histology, morphology, proximal, distal, medial, sagital, caudal, anterior (ventral), posterior (dorsal), lateral, cranial, frontal plane, sagital plane, transverse plane.

2. Differentiate between atoms, molecules and chemical compounds; colloidal suspensions and emulsions; and the processes of diffusion, osmosis and active transport.

3. Describe the pH scale and the role of buffers in an aqueous solution.

4. Label (a drawing of) a "typical animal cell" containing the following parts: cell membrane, nuclear membrane, endoplasmic reticulum (smooth and rough), vacuoles, Golgi body, nucleus, nucleolus, nucleoplasm, cytoplasm, mitochondria, centrioles, ribosomes, lysosomes.

5. Propose reasons for the function of the cellular structures as related to their specific structural characteristics.

6. Illustrate the role of cellular respiration with regard to total body metabolism demonstrating the flow of materials in terms of input--output and utilization.

7. Describe the roles of DNA, RNA and the ribosome in relation to the synthesis of proteins.

8. Examine the process of animal cell mitosis.

9. Integrate cell structure, cell metabolism, protein synthesis and mitosis as they relate to body growth and maintenance.

10. Identify the characteristics of selected tissue types, cartilage, bone, muscle (smooth, striated, cardiac), blood, connective, nerve, selected organs, and pathological samples if available.

11. Compare intramembranous and endochondrial bone formation.

12. List examples of the various joint types found in the human skeleton.

13. Identify, on a practical examination, the bones of the body and skull to include major structural characteristics of these bones.

14. Given a diagram of a cross section of the belly of a muscle, label the tendon, belly, epimysium, perimysium, endomysium and the sarcolemma.

15. Given a diagram of a striated muscle cell as seen under the electron microscope label the following parts: A Band; H Band, I Band, Z line, myosin, actin, sarcomere, cross bridges, t-tubules, and sarcoplasmic reticulum and relate these structures to the contraction process.

16. Integrate the following to explain a simple muscle contraction nerve impulse, ACH, calcium, ATP, ADP, glycogen, phosphate and creatine.

17. Explain the all-or-none law with relationship to motor unit and varying strengths of contraction.

18. Construct a graph of the following muscle actions: make and break shock, strength of stimulus, work done, summation, tetanus and fatigue.

19. Interpret a graph of the following muscle actions: make and break shock, strength of stimulus, work done, summation, tetanus and fatigue.

20. Draw a single contraction labeling the latent period, contraction period, and relaxation period. Define these periods and give their physiological significance.

21. Describe these periods and give the physiological significance of these periods.

22. Identify, on a practical examination, the major muscles of the cat.

COURSE OUTLINE

I. General Structure of the Body

A. Planes of reference

B. General regions

C. Levels of organization

II. Energy and Matter

A. Basic chemistry
1. Atoms, molecules, and chemical compounds
2. Collidal suspensions
3. Emulsions

B. Diffusion, osmosis, active transport

C. pH and buffers

III. Cell Structure and Function

A. Cellular structure

B. Cell metabolism - respiration

C. Protein synthesis

D. Growth and cell division

IV. Tissues

A. General histology

B. Pathological examples

V. The Skeleton

A. Bone structure and formation

B. Joints

C. Leverage

D. Structure and organization of the skeleton

E. Skeletal disorders

VI. Muscle Physiology and Action

A. Histology of striated muscle

B. Neuromuscular junction

C. Mechanism and chemistry of muscle contaction

D. Muscle twitch

E. Muscle tone

F. Effects of exercise on the body systems

G. Muscle action of various muscles

H. Muscular disorders

EXPERIMENTS AND/OR DEMONSTRATIONS

Chaffee, Ellen. Laboratory Manual in Physiology and Anatomy. 3rd. ed. Pennsylvania: J. B. Lippincott, 1969.

1. Introduction to the Body as a Whole (pp. 1-8)
2. The Cell (Part A, I, II, III, pp. 9-10)
3. Tissues (Part B, pp. 27-59)
4. Introduction to the Skeletal System (pp. 27=59)
5. Introduction to the Muscular System (pp. 61-70)

Anthony, Catherine. Anatomy and Physiology Laboratory Manual. C. V. Mosby, 1967.

6. Architectural Plan of Body (pp. 7-14)
7. Structural Units of Body (pp. 19-22)
8. Structural Units of Body (pp. 23-24)
9. Filtration, Diffusion, Osmosis (pp. 27-38)
10. Bones of the Human Skeleton (pp. 41-61)
11. Joints of Human Skeleton (pp. 63-71)
12. Structure, Location, Action of Skeletal Muscles (pp. 73-93)
13. Muscle Physiology (pp. 95-100)

Leavell, Chapin, and Miller. Workbook and Laboratory Manual in Anatomy and Physiology. 4th edition. New York: MacMillan

14. The Body as an Organized Whole (pp. 3-10)
15. Observations of Living Cells (pp. 17-20)
16. Osmosis and Diffusion (pp. 20-23)
17. Mitosis (p. 24-26)
18. A Study of Tissues (pp. 26-37)
19. A Study of Muscle Arrangement (pp. 41-43)
20. Physiological Properties of Muscle (pp. 45-48
21. Axial Skeleton (pp. 4-60)

Tuttle and Schottelius. Physiology Laboratory Manual. St. Louis: C. V. Mosby Co.

22. Diffusion (pp. 15-16)
23. Osmosis (pp. 17-19)
24. The Stimulus-Neuro-Muscular (pp. 24-26)

25. Factors Influencing Muscle Activity (pp. 27-29)
26. Capacity of Muscle to do Work (pp. 30-33)
27. Muscle Fatigue (pp. 34-35)
28. Bio-electrical Muscle (pp. 36-37)

Morrison, Cornett, Tether, Gratz. Experiments in Physiology. New York: Holt, Rinehart and Winston Inc., 1967.

29. Ionic Nature of Matter (pp. 6-8)
30. Behavior of Dispersions (pp. 8-9)
31. Cellular Structures (pp. 10-11)
32. Cell Division (pp. 11-13)
33. Tissues (pp. 14-16)
34. Structure of Bone and the Human Skeleton (pp. 16-20)
35. Muscle Physiology (pp. 20-22)

Cheet and Morton. A Physiology Manual. Richmond, Virginia: Phipps and Bird, Inc.

36. Muscle Twitch (pp. 19-20)
37. Muscle Response to Variation in Stimulus Strength (pp. 21-22)
38. Muscle Response to Variation in Stimulus Frequency (pp. 23-24)
39. Work Performed by Muscle (pp. 25-26)
40. Muscle Fatigue (pp. 27-28)

Jones and Lehman. Laboratory Guide in Introductory Vertebrate Zoology. Chapel Hill, N. C.: University of North Carolina, 1969.

41. Skeleton of Frog (pp. 5-15)
42. Skeleton of Man (pp. 18-19)
43. Muscles of the Frog (pp. 20-27)
44. Physiology of Muscle (pp. 28-38)

Biological Sciences Curriculum Study. Biological Science: Molecules to Man. Boston: Houghton Mifflin Co., 1963.

45. Electrolysis of Water (pp. 23-26)
46. Acids, Bases, and pH (pp. 26-28)
47. Catalytic Activity of Enzymes (pp. 32-33)
48. Effects of Various Factors on Enzyme Activity (pp. 33-37)
49. Activities of the Cell Membrane (pp. 37-39)
50. Cell Duplication (pp. 55-56)
51. Muscle Fatigue (pp. 114-115)

Elliott, A. M. Laboratory Guide for Zoology. 3rd. ed. Minneapolis: Burgens Publishing Co.

52. Morphology of a Typical Cell (Part A. p. 20)
53. Morphology of a Typical Cell (Part C. pp. 24-39)
54. Continuity of Life. Mitosis and Meiosis (pp. 175-182)

Wodsedalek, J. E. General Zoology Laboratory Guide. 5th ed. Dubuque, Iowa: William C. Brown and Co.

55. The Cell (pp. 8-11)

56. Tissues (pp. 11-35)
57. Mitosis (pp. 37-42)
58. Amphibia (pp. 191-218)
59. Mammalia (pp. 219-238)

Booth and Chiasson. Laboratory Anatomy of the Cat. Dubuque, Iowa: William C. Brown Co.

60. The Skeleton (pp 4-13)
61. The Muscular System (pp. 14-30)

PROJECTS

1. Production of permanent tissue slides using histological techniques.
2. Preparation of an animal skeleton selected by teacher and student.
3. Preparation of plaster model bones.

REPORTS

1. Functions of specific cell organelles.
2. Comparative study between mitosis and cancer.
3. Selected reports on diseases and/or disorders of bones.
4. Selected reports on diseases and/or disorders of muscles.

FIELD TRIPS

1. Physical Therapy Unit in a local hospital or nursing home.
2. Pathology laboratory at a local hospital.

SPEAKERS

1. American Cancer Society
2. Orthopedic Surgeon
3. Physical Therapist

DADE COUNTY 16mm FILMS

1. Osmosis
   AV# 1-11094, 14' C
2. Acids, Bases, and Salts
   AV# 1-10947, 21' C
3. Preface to Chemistry
   AV# 1-10888, 16' BW
4. Oxygen
   AV# 1-01970, 10' BW
5. Hydrogen
   AV# 1-10938, 14' C
6. The Colloidal State
   AV# 1-10933, 16' C
7. Cell's Chemical Organization (A.I.B.S. Pt. 1 No.4)
   AV# 1-30505, 30' C
8. Acid-Base Indicators
   AV# 1-10799, 19' C
9. The Cell: Structural Unit of Life
   AV# 1-02231, 10' C
10. Cell Reproduction (Mitosis)
    AV# 1-30511, 30' C
11. Cell Biology: The Unit of Life
    AV# 1-30525, 30' C
12. Cell Division
    AV# 1-02236, 11' BW
13. Mitosis and Meiosis
    AV# 1-11083, 15' C
14. DNA: Molecule of Heredity
    AV# 1-11078, 16' C
15. Cell Biology, Pt. 1, Cell Reproduction, No. 11, (A.I.B.S.)
    30' C
16. Cell Biology: Mitosis and DNA
    16' Coronet
17. Cell Biology, Pt. 1, What is a Cell? No. 3 (A.I.B.S.)
    AV# 1-30526, 30' C
18. Cell Biology, Pt. 1, Cell Respiration, No. 5
    AV# 1-30499, 29' C
19. Cell Biology, Structure and Composition Coronet
    13½' C
20. Staining
    AV# 1-02247, 10' C
21. The Spinal Column
    AV# 1-03059, 11' BW
22. The Skeleton
    AV# 1-03056, 12' BW
23. Human Body: The Skeleton
    AV# 1-03050, 10' BW
24. Muscles (A.I.B.S. Pt. 4, No. 8)
    AV# 1-30677, 28' C
25. Human Body. The Muscular System
    AV# 1-11273, 14' BW
26. Mechanism of Cell Division, AMA
    AV# 1254, 16' BW

27. The Thread of Life, (Pt. 1)
AV# 1-30568, 30' C
28. The Thread of Life, (Pt. 2)
AV# 1-30570, 30' C

FILM LOOPS
Available from Ward's

1. Norris Physiology Series. 73W1720
   a. "Frog Skeletal Muscle Response"
   b. "Work vs. Load in Frog Skeletal Muscle"
2. Histological Techniques 73W1808
3. Smear and Squash Techniques, I. 73W1809
4. Smear and Squash Techniques, II. 73W1810

SLIDES
Available from Dade County Audiovisual Center

1. Human Body Tissues
   AV# 5-30011
2. Human Muscular System
   AV# 5-30018
3. Skeleton of Man and Frog
   AV# 5-30023

Available from Ward's

4. The Skeletal System
   170W8490, 9 slides
5. Animal Mitosis
   171W0100, 10 slides
6. Animal Meiosis
   171W0600, 16 slides

Available from Carolina Biological

7. Histology Survey Set
   No. 108, 40 slides

FILM STRIPS

1. The New Concept of the Cell, 1519, FOM
2. DNA and Cell Chemistry, (set of 6), Ward's 70W3300
3. Cell Chemistry, DNA and Protein Synthesis, 70W3300
4. DNA and RNA, Evidence for Structure and Function
5. DNA, A Key to All Life, LIFE
6. Meiosis, Wards, 70W6080
7. Mitosis, 1524 FOM
8. Introduction to Histology, PSP, 1557
9. Osmosis, PSP, 1565
10. Muscle and Skeletal Systems, 2-1-A, Eye Gate House, Inc.
11. The Body Machine: Muscular System, FOM, 594

DADE COUNTY TRANSPARENCIES

1. Anatomy: Muscles, Skeleton
   AV# 2-30031
2. Human Muscular System
   AV# 2-00038
3. The Human Skeleton
   AV# 2-00055
4. Muscles - Man
   AV# 2-00059
5. Muscular System - Man
   AV# 2-00069
6. Skeletal and Nervous System
   AV# 2-00068
7. Skeletal System - Man
   AV# 2-00058

SUGGESTED DISCUSSION QUESTIONS

1. How do the structures of the different cell organelles relate to the functions they perform within the cell?
2. What laws govern the movement of materials into and out of a cell?
3. What reorganization of bone alignments would be necessary to switch from walking on all fours to walking upright?
4. What explanations can be offered to explain the fact that even though all body cells contain the same DNA, they are very different in structure and function?

REFERENCES

1. Crouch, James. Functional Human Anatomy. Pennsylvania: Lea and Febiger, 1970.
2. Chaffee, Ellen and Greisheimer, Esther. Basic Physiology and Anatomy. Pennsylvania: J. B. Lippincott Co., 1969.
3. Jacob, Stanley W. and Francone, Clarice A. Structure and Function in Man. Pennsylvania: W. B. Saunders.
4. Guyton, Arthur. Function of the Human Body. Pennsylvania: W. B. Saunders Co., 1969.
5. Ganang, William F. Review of Medical Physiology. Los Altos, California: Lange Medical Publications.
6. Carlson, Anton; Johnson, Victor and Cavert, H. Mead. Machinery of the Body. Chicago, Illinois: University of Chicago Press, 1961.
7. Frohse, Franz; Brodel, Max; Schlossberg, Leon. Atlas of Human Anatomy. New York: Barnes and Noble, 1961.
8. Booth, Ernest S. and Chiasson, Robert B. Laboratory Anatomy of the Cat. Dubuque, Iowa: William C. Brown Co.
9. DiFore, Mariand S. H. Atlas of Human Histology. Pennsylvania: Lea and Febiger, 1967.
10. DeRobertis, E. D. P.; Nowinski, Wiktorw and Saez, Francisco A. Cell Biology. Philadelphia, Pennsylvania: W. B. Saunders Co., 1968.
11. Torrey, Theodore W. Morphogenesis of the Vertebrates. New York: John Wiley and Sons Co., 1967.

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Experiments	Student Text	Supplementary References	Films	Film Loops	Film Strips	Demonstrations	Transparencies	Slides
1, 6, 14	2 pp.1-8	7 pp. 1-2 3 pp. 4-6 1 pp. 28-32 2 pp. 1-13 4 pp. 3-11 5 6 pp. 1-25				1, 6, 14		
9, 16, 22, 23, 29, 30, 45	2 pp.10-21	7 ------ 1 p. 34 2 pp. 14,31-37 3 ------ 4 pp. 22-30 5 pp. 8-13 6 pp. 27-66	1,3,4, 5,6,7		9	16, 22, 23, 30, 45		
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MASTER SHEET - INTRODUCTION TO ANATOMY AND PHYSIOLOGY (con't)

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9	2, 7, 15, 17, 31, 32, 47, 48, 50, 52, 53, 55, 57	2 pp.24-41	1 pp. 34-41 2 pp. 14-36 3 pp. 20-36 4 pp. 3-43 5 pp. 1-4 6 pp. 26-66 7 ------	9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19		1,2,3, 4,5,7	------		
10	3, 8, 33, 53, 56	2 pp.43-52	1 pp. 66-87 2 pp. 37-56 3 pp. 37-49 4 ------ 5 ------ 6 ------ 7 pp. 9-14 9 whole book	20		8	3, 8, 33, 53, 56		1, 7
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14	12, 19, 35, 43	2 pp.79-81	1 p. 204 2 pp. 114-117 3 pp. 118-119 4 pp. 69-84 5 pp. 36-37 6 pp. 432-482 7 ------	24, 25		10, 11	------		
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16	5, 12, 13, 20, 24, 25, 26, 27, 28, 35, 36, 37, 38, 39, 40, 44	2 pp.83-87	1 ------ 2 pp. 119-122 3 pp. 114-117 4 pp. 69-84 5 ------ 6 pp. 432-482 7 ------ 10 pp. 215-216	24, 25			5, 12, 13 20, 24, 25, 26, 27, 28, 35, 36, 37, 38, 39, 40, 44		

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MASTER SHEET - INTRODUCTION TO ANATOMY AND PHYSIOLOGY (con't)

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18	12, 13, 20, 24, 25, 26, 27, 28, 36, 37, 38, 39, 40, 44		1 ------ 2 pp. 114-117 3 pp. 119-122 4 pp. 69-84 5 pp. 22-25 6 pp. 432-483 7 ------		1a,1b		Same as 17		
19	13, 20, 24, 25, 26, 27, 28, 36, 37, 38, 39, 40, 44		1 ----- 2 pp. 114-117 3 pp. 119-122 4 pp. 69-84 5 pp. 22-25 6 pp. 432-482 7 -------		1a,1b		Same as 17		
20	Same as 19	2 pp.85-86	2 pp. 114-117 3 pp. 119-122 4 pp. 69-84 5 pp. 22-25 6 pp. 432-482 7 ------		1a,1b		Same as 17		
21	Same as 19	2 pp.85-86	Same as 19		1a, 1b		Same as 17		
22	61	2 pp.93-101	1 pp. 204-274 2 pp. 135-186 3 pp. 125-183 4 ------ 5 ------ 6 ------ 7 pp. 37-41 8 whole book					1, 2, 4, 5	2

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

HUMAN REPRODUCTION

5363.05
5346.05

SCIENCE
(Experimental)

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1971

HUMAN REPRODUCTION
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Written By
Alan Weiss, Richard Petty and Peter Saponaro
for the
DIVISION OF INSTRUCTION
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HUMAN REPRODUCTION

COURSE DESCRIPTION

This course will include an intensive in-depth study of reproductive organs, the menstrual cycle, pregnancy, embryology, and birth defects.

ENROLLMENT GUIDELINES

This is a course for the serious biology student and should follow credit or background in previous biology programs. It is, in part, a second course in biology, but it is well within the range of the average student.

STATE ADOPTED TEXTS

1. Kimber, et al. Anatomy and Physiology. New York: The Mac Millan Co., 1966.
2. Morrison, Cornett, Tether, Gratz. Experiments In Physiology. New York: Holt, Rinehart, and Winston, Inc., 1967.
3. Morrison, Cornett, Tether, Gratz. Experiments In Physiology. New York: Holt, Rinehart, and Winston, Inc., 1967.

PERFORMANCE OBJECTIVES

Students Will:

1. Relate the process of meiosis to gamete production in man.

2. Differentiate between the processes of oogenesis and spermatogenesis.

3. Identify in a practical laboratory examination, the male and female reproductive organs in a preserved cat, including the following:
   a. Male--scrotum, testes, spermatic cord, epididymis, seminiferous tubules, vas deferens, prostate gland, penis (2 corpora cavernosa penis 1 corpus cavernosum urethrae, glans, prepuce)
   b. Female--ovaries, uterine tubes (fimbriae, ostium) uterus (body, cervix, cornu) vagina, vestibule (clitoris, urinary mentus and vulva).

4. Integrate the functions of the following hormones: LH, FSH, LTH, progesterone and estrogen as they relate to the ovarian and uterine changes during the menstrual cycle

5. Integrate the following as they relate to the fertilization process: sperm viability, sperm transport, ovum viability, union of gametes and sex determination.

6. Describe the hormonal effects as they relate to the initiation and maintenance of pregnancy.

7. Investigate the development of the extra embryonic membranes as they apply to pregnancy.

8. Trace the development of the human fetus from conception to birth.

9. Describe the birth process (parturition) emphasizing the factors which initiate and control the process.

10. Describe the neural and hormonal regulating factors in the process of lactation.

11. Discuss the effects of selected examples of chemical substances on the reproductive system.

12. Examine the various types of diseases which result in birth defects as to cause, symptoms, treatment and malformations.

COURSE OUTLINE

I. Gamete Production
   A. Oogenesis
   B. Spermatogenesis

II. Reproductive Organs
   A. Female reproductive organs
   B. Male reproductive organs

III. The Menstrual Cycle
   A. Hormonal regulation of the cycle
   B. Ovulation

IV. Fertilization
   A. Sperm viability
   B. Sperm transport
   C. Ovum viability
   D. Union of gametes
   E. Sex determination

V. Pregnancy--gestation
   A. Luteal phase
   B. Placental phase
   C. Development of extra embryonic membranes
   D. Fetal - Maternal relationship
   E. Basic Human Embryology - comparative aspects
      1. Cleavage
      2. Blastula and gastrula formation
      3. Development of germ layers
      4. Fetal development - month to month
   F. Birth
   G. Lactation

VI. Effects of Various Chemicals
   A. Hallucinogens
   B. Tranquilizers
   C. Birth Control pills
   D. Fertility injections
   E. Alcohol and tobacco

VII. Birth Defects
   A. Causes
      1. German measles
      2. Venereal Disease
      3. Chemicals
      4. Heredity
      5. Others
   B. Prevention

EXPERIMENTS

Chaffe, Ellen. Laboratory Manual in Physiology and Anatomy. 3rd ed. Philadelphia: Lippincott, 1969.
1. Reproductive System (Lab #24 pp. 235-253)

Anthony, C.P. Anatomy and Physiology Laboratory Manual. St. Louis: C. V. Mosby, 1967.
2. Reproductive System (pp. 211-223)

Leavell, Chapin, and Miller. Workbook and Laboratory Manual in Anatomy and Physiology. 4th ed. New York: Macmillan, 1969.
3. Human Reproductive System - Male and Female (Lab #1 pp. 215-223)
4. Embryology - General Concepts (Lab #2 pp. 225-230)

Morrison, Cornett, Tether, Gratz. Experiments in Physiology. New York: Holt, Rinehart and Winston, Inc., 1967.
5. Inducing Ovulation (Experiment 84 pp. 67-68)

Jones and Lehman. Laboratory Guide in Introductory Vertebrate Zoology. Chapel Hill, N. C.: University of North Carolina, 1969.
6. Comparative Development of Chordates (Part 5 pp. 77-89)

Elliott, Am M. Laboratory Guide for Zoology. 3rd ed. Minneapolis: Burgess Publishing Co., 1969.
7. Development of the Individual - Embryology Starfish, Frog, Chick. (pp. 183-189)

Biological Science Curriculum Study. Biological Science: Molecules to Man. Boston: Houghton Mifflin Co., 1963.
8. Development of the Chick Embryo (Experiment 31 pp. 65-67)
9. Effects of Reproductive Hormones on Secondary Sex Characteristics (Experiment 52 pp. 108-109)

Wodsedalek, J. E. General Zoology Laboratory Guide. 5th ed. Dubuque, Iowa: Wm. C. Brown Co., 1963.
10. Cytology and Histology, Early Embryology (pp. 43-45)
11. Embryology of the Chick (pp. 239-256)
12. Gametogenesis, Meiosis, Fertilization and Sex Determination (pp. 257-262)

Harrison, Bruce M. Embryology of the Chick and Pig. Dubuque, Iowa: W.M. C. Brown, 1971.
13. Sixteen to Eighteen Hour Chick (pp. 13-19)
14. Thirty-three to Thirty-six Hour Chick (pp. 31-65)
15. Forty-five to Forty-eight Hour Chick (pp. 77-100)

EXPERIMENTS

16. Seventy-two Hour Chick (pp. 101-135)
17. Pig Uterus and Placenta (pp. 163-171)
18. Microscopic Structure of Testis and Ovary (pp. 173-184)
19. Gross Dissection of the 10-12 mm Pig (pp. 194-197)

Booth and Chiasson. Laboratory Anatomy of the Cat. Dubuque, Iowa: Wm. C. Brown, 1967.
20. The Urinary and Reproductive Organs (pp. 47-50)

DEMONSTRATIONS

1. Demonstrations of Human Development Models, Carolina 56-3115
2. Demonstrations of Animal Meiosis and Mitosis, Carolina 56-1630.
3. Chick Whole Mount Set, 2 X 2 slides, Carolina 60.
4. Embryology of the Frog, 20 2X2 slides, Wards 95W1570
5. Fetal Development - Human 2 X 2 slides, Carolina 86.

PROJECTS

1. Construct a window on a fertilized chick egg to observe its development.
2. Construction of a large chart illustrating hormonal regulation of the endometrial lining.
3. Induce ovulation and observe fertilization in sea urchins.
4. Induce ovulation and observe development of tadpoles in grass frogs.
5. Prepare permanent slides of rat testes and ovary.
6. Prepare permanent whole mount slides of chick embryos at 24, 33, 48, and 72 hours.

REPORTS

1. Effects of various chemicals on the fetus.
2. Effects of various diseases on the new born child.
3. Comparative embryology.
4. Correlation between age of parents at the birth of the child and how it affects the physical, mental, and psychological development of the child.
5. Venereal Disease.

SPEAKERS

1. Obstetrician
2. Public Health Physician.

FILMS

Available from Dade County Audio Visual Center

1. Cell Reproduction
   AV # 1-30511 30 min. C

2. Chick Embryo: From Primitive Streak to Hatching
   AV # 1-11518 13 min. C

3. Chromosomes and Sex,
   AV # 1-30577 28 min. C

4. Development of Organs
   AV # 1-30484 28 min. C

5. Development of the Chick
   AV # 1-03856 10 min. BW

6. Development of the Chick Embryo
   AV # 1-03872 5 min. C

7. Fertilization
   AV # 1-30464 28 min. C

8. The Human Body - Reproductive System
   AV # 1-11249 16 min. C

9. Human Reproduction
   AV # 1-11252 21 min. C

10. Miracle of Reproduction
    AV # 1-11258 20 min. BW

11. Mitosis and Meiosis
    AV # 1-11083 15 min. C

12. Patterns of Reproduction
    AV # 1-30449 28 min. C

13. Population Patterns in the U.S.
    AV # 1-00311 11 min. BW

14. Reproduction
    AV # 1-30532 28 min. C

15. Reproduction Among Mammals
AV # 1-02428 11 min. BW

16. Reproduction in the Sea Urchin
AV # 1-11055 13 min. C

17. Reproductive Hormones
AV # 1-30454 28 min. C

18. The Sex Cells
AV # 1-30534 28 min. C

19. Hormones (A.I.B.S. Pt. 4, No. 7)
AV # 1-30479 28 min. C

20. Behavior (A.I.B.S. Pt. 4, No. 11)
AV # 1-30692, 28 min.. C

FILM LOOPS

Available from Ward's

1. Estrous Cycle of Rat
73W1707

2. Inducing Ovulation in Frogs
73W1710

3. Removing Chick Embryo With Hot Wire
73W1708

SLIDES

1. The Reproductive System, 170W8990, 34 slides. (Ward's)

2. Animal Meiosis, 171W0600, 16 slides. (Ward's)

3. Embryology of the Frog, 171W1000, 8 slides. (Ward's)

4. Embryology of Chick, 171W1100, 11 slides. (Ward's)

5. Mammalian Ovary Set, No. 82, 7 slides, $5.25. (Carolina)

6. Human Fetal Development Set, No. 86, 9 slides, $6.75. (Carolina)

FILM STRIPS

1. Life Before Birth, Part I — LIFE
2. Life Before Birth, Part 2 — LIFE
3. Reproductive System — Eye Gate House, 2-1-D
4. Meiosis

TRANSPARENCIES

1. The Reproductive System, 75W4170 (20 trans) Ward's
2. Animal Meiosis, 50-1611, Carolina
3. Human Development 2, 50-3103, Carolina
4. H. D. 3 50-3105, Carolina
5. H. D. 4 50-3107, Carolina
6. H. D. 5 50-3109, Carolina
7. H. D. 8 50-3115, Carolina
8. H. D. 9 50-3117, Carolina
9. H. D. 19 50-3137, Carolina
10. H. D. 20 50-3139, Carolina
11. H. D. 21 50-3141, Carolina
12. H. D. 22 50-3143, Carolina
13. H. D. 23 50-3147, Carolina

ADDITIONAL INNOVATIVE ACTIVITIES

1. Observing the effect of testosterone injections and surface application on comb development and other secondary sex characteristics in young male chicks.

REFERENCES

1. Arey, Leslie Brainerd. Developmental Anatomy. Philadelphia: W.B. Saunders, 1965.

2. Balinsky, B. I. An Introduction to Embryology. Philadelphia: W. B. Saunders, 1970.

3. Booth, Ernest S. and Chiasson, Robert B. Laboratory Anatomy of the Cat. Dubuque, Iowa: Wm. C. Brown Co., 1967.

4. Carlson, Anton: Johnson Victor; and Carvert, H. Mead. Machinery of the Body. Chicago: University of Chicago Press, 1961.

5. Chaffee, Ellen and Greisheimer, Ester. Basic Physiology and Anatomy. Philadelphia: J. B. Lippincott, Co., 1969.

6. Crouch, James. Functional Human Anatomy. Philadelphia: Lea and Febiger, 1970.

7. De Robertis, E.D.P., Nowinski, Wiktow, and Saez, Francisco A. Cell Biology. Philadelphia: W. B. Saunders, 1968.

8. Di Fore, Mariano S. H. Atlas of Human Histology. Philadelphia: Lea and Febiger, 1967.

9. Ehrlick, Paul. The Population Bomb. New York: Ballantine Books, 1968.

10. Frohse, Franz; Brodel, Max and Schlossberg, Leon. Atlas of Human Anatomy, New York: Barnes and Noble, 1961.

11. Ganang, William F. Review of Medical Physiology. Los Altos, California: Lange Medical Publications.

12. Guthmacher, A. Pregnancy and Birth. New York: Signet Books, 1962.

13. Guyton, Arthur, Function of the Human Body. Philadelphia: W.B. Saunders, 1969.

14. Hauser, Philip, ed. The Population Dilemma, Englewood Cliffs, New Jersey: Prentice-Hall, 1963.

15. Jacob, Stanley W. and Francone Clarice A. Structure and Function in Man. Philadelphia: W. B. Saunders.

16. King, A. and Nicol E. Venereal Disease. London: Cassell, 1964.

REFERENCES

17. Kistner, R. The Pill. New York: Delacorte Press, 1968.

18. Maxwell, G.E. Why The Rise in Teenage Syphilis? and Why The Rise in Teenage Gonorrhea? Reprints from American Medical Association, 535 N. Dearborn, Chicago.

19. Morton, R.S. Venereal Disease. Great Britain: Penguin Books, 1966.

20. Paddock, William and Paul. Famine 1975: America's Decision, Who Will Survive. Little, 1968.

21. Patten, Bradley M. Early Embryology of the Chick. New York: McGraw-Hill Book Co., 1964.

22. Patten, Bradley M. Enbryology of the Pig. New York: McGraw-Hill, 1948.

23. Patten, Bradley M. Foundations of Embryology. New York: McGraw-Hill, 1964.

24. Schwartz, Wm. F. Facts about Syphilis and Gonorrhea. American Association for Health Physical Education and Recreation, Washington, D.C., 1966.

25. Torrey, Theodore W. Morphogenesis of the Vertebrates. New York: John Wiley and Sons, Co., 1967.

MASTER SHEET - HUMAN REPRODUCTION

Objectives	Experiments	Student Text	Supplementary References	Films	Film Loops	Film Strips	Demonstrations	Transparencies	Slides
1	5, 12, 18	2 pp.443-445	6 pp.42-44, 457-651 15 pp.494-496 13 pp.439-440 433-434 11 pp.345-346 354 4 pp.621-624 7 pp.207, 237-245 25 pp.53-60 2 pp.5,21,3 1 pp.29-39 23 pp.34-36, 48-52 21 pp.17-21 22 pp.12,15,21	11, 18					
2	5, 12, 18	2 pp.443-445	Same as #1	1,3, 11,18			2		2
3	1, 2, 3, 20	2 pp.425-430	3 pp.47-50 6 pp.477-479 5 pp.569-597 15 pp.473-510 11 pp.334-369	8, 9, 14		3		1	
4		2 pp.403-405	6 pp.472 5 pp.583-586 15 pp.491-493 13 p.451 11 pp.353-369 4 pp.625-635 644-646 25 pp.101-105 2 pp.394,63 1 pp.151-165 23 pp.64-66 21 p.18 22 p.33	17,19	1, 2				5
5	5, 7, 10	2 pp.430-433	5 p.591 15 pp.494-496 13 pp.438-452 11 pp.176,351 385-1351 4 pp.621,628 7 pp.273-280 25 p.286 2 pp.51-71 1 pp.50-54, 59,312 23 pp.67-76 22 pp.23-36	7					
6		2 pp.433-436	6 pp.468-478 5 pp.591-597 15 pp.490-493 13 pp.442-459 11 pp.365-367 2 pp.207-226 21 Whole Book 22 Whole Book	17,19					

MASTER SHEET - HUMAN REPRODUCTION (con't)

Objectives	Experiments	Student Text	Supplementary References	Films	Film Loops	Film Strips	Demonstrations	Transparencies	Slides
7	3, 4, 6, 10, 11, 13, 14, 15, 16, 17, 19	2 pp.433-436	6 pp.468-478 5 pp.591-597 15 pp.490-493 13 pp.442-459 11 pp.365-367 3 pp.124-147 2 pp.207-226 1 pp.114-118 144 23 pp.176-189 21 Whole Book 22 Whole Book	2,4,5, 6	3	1, 2	3,4,5		3, 4
8		2 pp.436-438	6 pp.468-478 5 pp.591-597 15 pp.490-493 13 pp.442-459 11 pp.365-367 2 pp.207-226 1 pp.124-247 23 pp.176-189 21 Whole Book 22 Whole Book	2,4,5, 6,10, 12		1,2	1,3,4, 5	3,4,5, 6,7,8, 9,10, 11,12, 13	3,4,6
9	4, 17	2 pp.437-438	6 p.472 5 p.596 13 pp.455-456 4 343,640 701-705 2 pp.224-226 1 pp.140-143				1		
10			5 pp.551-589 15 pp.490-491 13 pp.457-458 11 pp.367-369 4 pp.646-648 705-706 23 p.66	17, 19					
11			17 Whole Book						
12		1 pp.749-752	16 Whole Book 19 Whole Book 18 Whole Book 24 Whole Book						

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

MAN AND DISEASE

5314.06

SCIENCE
(Experimental)

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1971

MAN AND DISEASE

5314.06

SCIENCE

(Experimental)

Written By Ted Boydston and Morton Raisen
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida
1971

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MAN AND DISEASE

COURSE DESCRIPTION

This course presents a study of disease and man's efforts in fighting it through the ages.

ENROLLMENT GUIDELINES

Recommended for students whose interest and background in science is extremely limited.

STATE ADOPTED TEXTS

1. Brandwein, P., et al. Life: Its Forms and Changes. New York: Harcourt, Brace and World, Inc., 1968.

2. Oxenhorn, J. and Idelson, M. Pathways In Science: Biology 1, 2 and 3. New York: Globe Book Co., Inc., 1968.

3. Thurber, W. and Kilburn, R. Exploring Life Science, Exploring Science Series. Boston: Allyn and Bacon, 1965.

* 4. Weinberg, S. L. Biology, An Inquiry Into the Nature of Life. Boston: Allyn and Bacon, 1971.

5. Wong, H. and Dolmatz, M. Ideas and Investigations in Science: Biology. New Jersey: Prentice-Hall, Inc., 1971.

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* Not state adopted

PERFORMANCE OBJECTIVES

1. Given a list of the five major plagues of the world and a description of each, the student will be able to match the name and the description.

2. Given the five major causes of disease in the United States, the student will be able to classify them in the order of the major causes of death.

3. Given a list of five great scientists, the student will be able to match them to a description of their major contributions.

4. Using slides and transparencies, the student will observe and draw pictures of basic structures of the three types of bacteria.

5. The student will be able to observe and identify, under the microscope or microprojector, living bacteria, bread molds and protozoans.

6. The student will culture organisms in hay infusion or other simple medium and systematically observe them under the microscope or microprojector.

7. The student will be able to describe three examples of symbiotic relationships including at least one example of bacteria and protozoans in man.

8. The student will describe the probable results for the world in the absence of saprophytic (decomposers) bacteria.

9. Given a list of five diseases in specific hosts, the student will be able to match them with the parasite causing the disease.

10. The student will be able to state or identify five examples of beneficial microorganisms.

11. The student will be able to use simple staining techniques to observe bacteria.

12. Given a typical growth curve of a population of microorganisms, the student will be able to explain the activities during each phase.

13. Using a growth curve of human population, the student should be able to interpret disease as a controlling factor of human population.

14. The student will be able to list the four basic steps of infection.

15. The student will describe three of the characteristics of infection.

PERFORMANCE OBJECTIVES (CONT'D.)

16. The student will be able to list the three major lines of defense against disease.

17. For each of the three lines of defense the student will give one example of the means of defense.

18. The student should be able to list three vaccinations commonly given and state whether each is permanent or temporary.

19. A student will be able to distinguish between a serum and a vaccine.

20. The student will be able to list the two major means of transmission of organic diseases.

21. The student will be able to list the three main steps in the prevention of the spreading of disease.

22. Given examples, the student will be able to identify those plants and animals of South Florida that are harmful.

23. Given a list of household chemicals, the student will be able to identify major poisonous chemicals, such as lye, mercury and lead.

24. The student will be able to classify the beneficial and harmful effects of common drugs.

25. The student will be able to describe the results of protein deficiency in the human diet.

26. The student will be able to recognize the problems resulting from deficiencies of the following vitamins: A, B's, C, D, E (coenzymes).

27. The student will be able to list the seven warning signs of cancer.

28. The student will be able to select from a list, the common diseases of organs and tissues.

29. The student will be able to describe the three major causes of heart disease.

30. The student will be able to select from a list, the major functional nervous diseases.

31. The student will be able to select the major occupational causes of disease.

PERFORMANCE OBJECTIVES (CONT'D.)

32. The student will identify the major genetic and congenital diseases.

33. The student will be able to define the following:

Words	Suffixes
Contagious disease	itis
Infection	emia
Disease	ism
Acute disease	phobia
Chronic disease	osis
Organic	
Vaccine	
Immunity	
Epidemic	
Sanitation	
Antisepsis	
Parasite	
Toxin	
Allergy	
Poison	
Antibodies	

COURSE OUTLINE

I. Introduction

A. Definition, extent and preview

B. History of great plagues

1. Plague of Athens 400 B.C.
2. Fire of St. Anthony 100 A.D.
3. Black Death 1300 A.D.
4. Syphilis 1500 A.D.
5. Cholera 1800 A.D.
6. Malaria
7. Typhus
8. Influenza

C. Major causes of death

1. Heart disease
2. Cancer
3. Brain hemorrhage
4. Kidney inflammation
5. Influenza

D. Major contagious diseases in the U.S.

E. Great names in disease

1. Hippocrates
2. Leeuwenhoek
3. Spallanzani
4. Louis Pasteur
5. Robert Koch (4 principles)
6. Joseph Lister
7. Edward Jenner
8. Paul Ehrlich

II. Microorganisms

A. Types of microorganisms

1. Bacteria

a. Structure
b. Classifications
c. Diseases caused by bacteria

2. Viruses

a. Structure
b. Classifications
c. Diseases caused by viruses

B. Detection and identification of microorganisms

1. Staining

a. Simple
b. Double

2. Culture
3. Growth curves

C. Importance of microorganisms

III. Infection and Disease

A. Types of infection

B. Specific diseases

C. Results of disease

IV. Defenses Against Disease-causing Bacteria

A. Steps of infection

1. Multiplication of bacteria
2. Release of toxic materials
3. Defensive reaction of body

a. Structural-skin, mucus membrane, cilia
b. Cellular-leucocytes
c. Chemical-lypozymes, antibodies

B. Characteristics of infection

C. Immunity

1. Permanent
2. Temporary
3. Common types of immunizations

D. Principles of chemotherapy: antibodies/resistance

E. Transmission of disease--contagion

1. Contact
2. Vectors

a. Fungal
b. Protozoans
c. Worms

3. Endemic, epidemic, and pandemic

V. Prevention of Disease

A. Sanitation

B. Sepsis vs. asepsis vs. antisepsis

VI. Disturbances Caused by Physical and Chemical Agents

A. Physical

1. Sunburn
2. Sunstroke
3. Motion

B. Chemical

1. Poisonous plants, venomous animals
2. Poisons - lye, mercury, lead
3. Drugs and alcohol

VII. Conditions of Starvation and Deficiency

A. Carbohydrate and protein deficiencies

B. Vitamin deficiencies

1. Vitamin A -- night blindness
2. Vitamin B -- Beriberi, pellegra
3. Vitamin C -- Scurvy
4. Vitamin D -- Rickets

VIII. Disorders of Organs and Tissues

A. Diabetes Mellitus

B. Endocrine abnormalities

C. Tumors (7 warning signs of cancer)

D. Blood cell disorders

IX. Mental and Nervous Afflictions

X. Occupational Hazards

A. Contact with lead, phosphorous, radium

B. Dust from coal, quarries, asbestos, fiberglass

C. Physical conditions, unusual heights, depths, falling objects

XI. Genetic and Congenital Conditions

XII. Childhood Diseases

EXPERIMENTS AND DEMONSTRATIONS

Filledes. Experimental Physiology and Applied Biology. Educators Publishing Service, 1967.

1. Drawing a Sample of Blood (Exp. 7, p. 25)
2. Blood Smear (Exp. 8, p. 27)
3. Observing Leukocytes (WBC) (Exp. 10, p. 31)

Otto, Towle and Crider. Biology Investigations. New York: Holt, Rinehart and Winston, 1965.

4. Composition and Lytic Cycle of a Bacterial Virus (15-1, p. 103)
5. The Bacteria--Forms and Motility (15-2, p. 107)
6. Laboratory Culture of Bacteria (16-2, p. 111)
7. Distribution of Bacteria (16-3, p. 115)
8. Staining Bacteria (16-4, p. 119)
9. Dilution & Plating-out Procedures (16-5, p. 121)
10. Bacteriological Analysis of Milk Products (16-6, p. 125)
11. Effect of Temperature on the Growth of Bacteria in Milk (16-7, p. 127)
12. Bacteriological Analysis of Water (16-8, p. 131)
13. Effect of Antiseptics on the Growth of Bacteria (17-1, p. 135)
14. Effects of Antibiotics on Bacteria (17-2, p. 139)
15. Unicellular Organisms - the Protozoans (18-1, p. 145)
16. Structure and Distribution of Common Molds (19-1, p. 155)
17. Study of Yeast (19-2, p. 159)
18. Life in Soil Communities (49-3, p. 343)

Weinberg. Biology: An Inquiry Into the Nature of Life. (Laboratory Manual) Allyn and Bacon, Inc., 1966.

19. Imitation of Life (Ex. 2, p. 5)
20. The Compound Microscope (Ex. 3, p. 7)
21. Yeast (Fungus) (Ex. 8, p. 29)
22. Enzymes (Ex. 9, p. 33)
23. Mitochondria (Ex. 10, p. 35)
24. Vitamin C (Ex. 12, p. 41)
25. Bread Mold (Ex. 18, p. 59)
26. Nematodes (Ex. 19, p. 63)
27. Daphnia (Ex. 22, p. 75)
28. Planaria (Flat Worms) (Ex. 23, p. 79)
29. Paramecium (Ex. 24, p. 83)
30. Observing Bacteria (Ex. 26, p. 89)
31. Diffusion through a Membrane (Ex. 28, p. 95)
32. Circulation (Ex. 32, p. 113)
33. Blood Cells (Ex. 34, p. 121)
34. Typing Blood (Ex. 35, p. 125)
35. Blood Clotting (Ex. 36, p. 129)
36. Immunology and Evolution (Ex. 58, p. 211)
37. Soil Organisms (Ex. 62, p. 225)

EXPERIMENTS AND DEMONSTRATIONS (CONT'D.)

38. Identifying Bacteria (Ex. 64, p. 231)
39. Koch's Postulates (Ex. 65, p. 237)
40. Plant Tumors (Ex. 66, p. 239)
41. Mutation in Bacteria (Ex. 67, p. 241)

Lawson and Paulson. Laboratory and Field Studies in Biology.
New York: Holt, Rinehart and Winston, 1960.

42. Do Microorganisms, Molds and Bacteria, Digest Complex Foods? (p. 121)
43. How Microorganisms, Yeasts and Bacteria, Get Their Energy (p. 133)
44. Distribution of Bacteria (p. 229)
45. Microbes as Scavengers (p. 239)
46. An Antibiotic in Your Own Backyard (p. 241)
47. Bacterial Sensitivity to Antibiotics (p. 243)
48. Observation of Parasites on a Host (p. 247)
49. A Protozoan Infection in Rats (p. 249)
50. A Simulated Epidemic (p. 251)

B.S.C.S. Biological Science: An Inquiry Into Life.
Harcourt, Brace and World, Inc., 1963.

51. Cork - An Investigation into Form and Function (p. 23)
52. A Disease of Bacteria (p. 69)
53. Staining and Observing Bacterial Cells (p. 72)
54. War on Bacteria (p. 77)
55. The Environment of a Microorganism (p. 78)
56. Discriminating Microorganisms (p. 80)
57. Fungus Among Us (p. 83)
58. A Population Genetics Study (p. 198)
59. Sickle Cells and Selection (p. 211)

PROJECTS

Simon, Harold J. Microbes and Men.
Washington D.C.: National Science Teachers Association, 1963.

1. Study of Microbial Life in a Pond (p. 145)
2. Microbes in Bread (p. 147)
3. Response to Stimuli (p. 147)
4. Population Growth (p. 151)
5. Effectiveness of Various Germicidal Compounds (p. 151)
6. Fermentation (p. 198)

7. Prepare a chart of the life cycle of common disease-causing parasites.

8. Make structural models of antibiotics and show how they work.

9. Study population curves in yeast cultures and the effects of variables.

Berman, William. Experimental Biology: Roads to Research.
New York: Sentinal Books Publishers, Inc.

10. Cancer and Bacteria - Research in Plant Cancer (pp. 67-83)
11. Leukocytes - the Silent Defenders (pp. 9-31)

REPORTS

1. History of spontaneous generation.
2. Importance of a balanced diet.
3. Can we survive without insecticides?
4. Symptoms of deficiencies of Vitamin A, B, C, D and E.
5. One of the world's great plagues.
6. Diet and heart disease.
7. Any disease.

FIELD TRIPS

1. Hospital visitation
2. Water Treatment Plant
3. Sewage Plant tour
4. Trip to a polluted body of water
5. Visit a Public Health Center

DADE COUNTY 16mm FILMS

1. Allergies
   AV#1-11117 16' C
2. Amoeba
   AV#1-02717 10' BW
3. Antibiotics
   AV#1-11356 14' BW
4. Bacteria (A.I.B.S.)
   AV#1-30665 28' BW
5. Bacteria--Friend and Foe
   AV#1-02363 11' C
6. Bacteria Laboratory Study
   AV#1-11118 15' C
7. Body Defenses Against Disease
   AV#1-03062 11' BW
8. Body Fights Bacteria
   AV#1-12969 15' BW
9. Careers in Bacteriology
   AV#1-10328 15' C
10. Defense against Invasion
    AV#1-11297 15' C

DADE COUNTY 16mm FILMS (CONT'D.)

11. Fungi
AV#1-11114 15' C

12. Germ Theory of Disease, The (A.I.B.S.)
AV#1-30730 28' C

13. Heart Disease (Its Major Causes)
AV#1-13097 11' BW

14. Heredity and Pre-Natal Development
AV#1-13029 21' BW

15. Immunization
AV#1-03266 11' BW

16. Infectious Disease and Man-Made Defenses
AV#1-02366 11' C

17. Life Cycle of the Mosquito
AV#1-02792 10' BW

18. Microorganisms: Beneficial Activities
AV#1-11358 15' C

19. Microorganisms: Harmful Activities
AV#1-11360 15' C

20. Microorganisms That Cause Disease
AV#1-03413 11' C

21. Penicillin (First Major Test)
AV#1-30729 28' BW

22. Phagocytes: The Body's Defender
AV#1-03103 10' C

23. Simple Plants: Bacteria
AV#1-11120 14' C

24. Staining (Biology Lab Tech.)
AV#1-02247 10' C

25. Virus (A.I.S.B.)
AV#1-02733 28' BW

DADE COUNTY 16mm FILMS (CONT'D.)

26. Wheat Rust
AV#1-11102 15' C

27. Why Foods Spoil
AV#1-11549 14' C

28. World of Dr. Vishniac, The
AV#1-11070 20' C

SUGGESTED DISCUSSION QUESTIONS

1. Effect of great plagues in the history of man.
2. What would occur if we did not know about vitamins?
3. What are some of the results of water pollution?
4. Discuss the relationship between a specific population and contagious and non-contagious disease.
5. Discuss the precautions necessary to decontaminate a room occupied by a person having a contagious disease.
6. Is drug addiction a disease as alcoholism is considered a disease?
7. Euthanasia, pro and con.
8. Cryogenics, an escape of today's incurable diseases.
9. What are some of the genetic diseases? Can we find cures?
10. Has man's medical knowledge decreased man's physical survival factor?
11. Atomic energy--friend or foe in medicine.
12. Is pollution a disease? What is the student's role?

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2. Biological Science Curriculum Study. Biological Science: Molecules to Man. 2nd Ed. Blue Version, Boston: Houghton-Mifflin Co., 1968.

3. Biological Science Curriculum Study. Biological Science: Patterns and Processes. New York: Holt, Rinehart and Winston, Inc., 1966.

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5. de Kruif, Paul. Microbe Hunters. New York: Pocket Books, Inc., 1959.

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14. Weinberg, S. L. Biology: An Inquiry Into The Nature of Life. Boston: Allyn and Bacon, 1971.

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MASTER SHEET - MAN AND DISEASE

Objectives	Laboratory Experiments and Demonstrations	Projects	Reports	Field Trips	Films	Discussion Questions
1		7	5	5	12, 16, 21	1
2				1, 5	1, 5, 13	4, 5
3			1		16	10
4	5, 30, 38, 44	1, 10		3, 5	4, 6, 11, 18	5, 7
5	5, 30, 38, 44					
6	6, 7, 16					
7	18, 37, 49	4		2, 3, 5	5, 16, 18	4
8	16, 18, 37	2		2, 3, 4	11, 27	3, 4
9		10	5, 6	5	20, 21	3
10	18, 37	9		4	15, 18	
11	8, 38, 53				24	
12	11, 13, 14, 50	6, 9				
13	11, 13, 14, 50	6, 9				
14				5	10, 16	
15				5	10, 16	
16				5	10, 16	
17	14, 56	8		1	7, 8, 10, 16	
18	14, 56	8		1	7, 8, 10, 16	
19	1			1	16	10
20	7, 15, 16, 49, 50	5		1, 5	16, 19	
21	13, 14, 46, 50	4, 5		3	15, 21, 22	3, 5
22						
23						
24			2	1		6
25						9
26			4	1		10
27						

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MASTER SHEET - MAN AND DISEASE (con't)

Objectives	Laboratory Experiments and Demonstrations	Projects	Reports	Field Trips	Films	Discussion Questions
28		10	6	1, 5		2
29			6	1	13	10
30						
31				1		11
32	41, 52	10				9

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

MAN'S SENSES

5311.23
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SCIENCE
(Experimental)

56

DIVISION OF INSTRUCTION • 1971

DADE COUNTY PUBLIC SCHOOLS

MAN'S SENSES
5311.23
5312.23
5313.23
SCIENCE

(Experimental)

Written by June Castaldi and Barbara Burbidge
for the
DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Fla.
1971

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MAN'S SENSES

COURSE DESCRIPTION

A basic survey course of the human nervous system with emphasis on the five senses and their importance.

ENROLLMENT GUIDELINES

None

STATE ADOPTED TEXTS

1. Brandwein et al, The World of Living Things.
   New York: Harcourt, Brace, and World, 1964.

2. Frazier and Smith, The Biological Sciences.
   Illinois: Laidlaw Brothers, 1969.

3. Oxenhorn and Idelson, Pathways in Science (Biology 2).
   New York: Globe, 1968.

4. Thurber and Kilburn, Exploring Life Science.
   Boston: Allyn and Bacon, 1970.

60/61

PERFORMANCE OBJECTIVES

1. The student will integrate functions of the nervous system by tracing a stimulus to its effect.

2. Given an animal eye to dissect, the student will locate the important structures.

3. The student will relate the eye structures to the proper functions.

4. Given a diagram of the ear, the student will relate the functions of each structure to hearing.

5. Given a series of activities to perform, the student will relate the results to sound perception.

6. Through laboratory experience, the student will discover the mechanisms of balance and motion.

7. Given an assortment of materials in solid, liquid, and gaseous states, the student will identify factors that influence man's sense of smell.

8. The student will investigate his own taste perception by plotting a taste map of the tongue.

9. Through a series of activities, the student will suggest reasons why there are varying concentrations of touch receptors on different parts of the body.

10. From a given list of "feelings", (including hunger, thirst, fatigue, and E.S.P.), the student will describe at least one of them from personal experience.

COURSE OUTLINE

I. Introduction

A. The Sense Organs
1. Definition
2. Kinds
3. Purpose

B. Stimuli
1. Definition
2. Origin of stimuli

II. The Nervous System

A. Brain
1. Structure
2. Patterns in the cerebrum

B. Spinal Cord
1. Structure
2. Conduction pathways

C. Nerves
1. Structure
2. Function

III. The Sensation of Seeing

A. Structure and function of the eye

B. How the eye "sees"

C. Accomodation

D. Common eye defects and diseases

E. Care of the eyes

F. Perception
1. Color and colorblindness
2. Depth perception
3. Binocular vision
4. Night vision

G. Optical illusions

IV. The Sensation of Hearing

A. Structure and function of the ear

B. How the ear "hears"

C. Ear defects, diseases, and corrections

D. Care of the ears

E. Perception of sounds

F. Sound pollution

V. The Sensation of Balance and Motion

A. Upon what does balance and motion depend?

B. Structures involved in balance and motion

VI. The Sensation of Smell

A. Structure and function of the nose

B. How the nose "smells"

C. Care of the nasal passages

D. Diseases of the nose

VII. The Sensation of Taste

A. Structure and function of the tongue

B. Structure of a taste bud

C. How "taste buds" work

D. Relationship of smell to taste

E. Care of the tongue

F. Diseases of the tongue

VIII. The Sensation of Touch (Pain, Pressure, Temperature)

A. Structure of the skin

B. Structure and location of nerve endings in skin

C. Function of touch nerves

D. Importance of this sense of touch

E. Care of the skin

F. Diseases of the skin

IX. The Sensation of Feelings

A. Hunger

B. Thirst

C. Fatigue

X. Extra Sensory Perception

EXPERIMENTS

Otto and Towle. Modern Biology.
New York: Holt, Rinehart, and Winston, 1965.

Otto, Towle, and Crider, Teachers Guide to the Modern Biology Program.
New York: Holt, Rinehart, and Winston, 1965.

1. Reflex Actions: The Path of a Spinal Reflex (Inv. 44-1, pp.256-257)
2. Sensory Receptors: Part 1, The Chemical Senses (Inv. 44-2, pp.257-258)
3. The Sensation of the Skin: Part 2 (Inv. 44-2, p.258)
4. Hearing and Equilibrium: Part 1, Structure of the Ear (Inv. 44-3, p.258)
5. Equilibrium Reactions in Man: Part 2 (Inv. 44-3, pp.258-259)
6. The Eye and Vision: Part 1, Structure of the Eye (Inv. 44-4, pp.259-260)
7. Dissection of the Eye: Part 2 (Inv. 44-4, p.260)
8. Locating the Blind Spot: Part 4 (Inv. 44-4, pp. 260-261)

Frazier and Smith. The Biological Sciences.
Illinois: Laidlaw Bros., 1969.

9. Find Out by Trying (Heat and the Skin) p.281
10. Find Out by Trying (Mapping Touch Sensors) p.335
11. Challenges in Science (Nerve Impulses) #1, #2, #3, p.341
12. Some Things to Do (Balance and Motion) #3, p.341
13. Some Things to Do (Sense of Taste) #4, p.341

Brandwein et al. The World of Living Things.
New York: Harcourt, Brace, and World, 1964.

14. Spinal Cord p.322
15. Conditions for Seeing p.326
16. Seeing p.327
17. How You Hear p.328
18. Touch Sensation p.330
19. Sense of Taste p.330
20. Sense of Smell p.331
21. Sense of Smell, #1, p.332
22. Finding Sensory Nerve Endings, #2, p.333
23. Test Your Hearing, #5, p.333

Thurber and Kilburn. Exploring Life Science.
Boston: Allyn and Bacon, 1966.

24. Responses in Earthworms, p.339
25. External and Internal Stimuli, p.339
26. Transmission Time, p.341
27. Reflexes, pp.346-347
28. Curvature and Focusing, pp.306-307
29. Focusing the Eye, p.307
30. Near and Distant Vision, p.308

31. Imitating the Bleaching Process p.309
32. The Blind Spot p.310
33. Range of Vision p.310
34. Range of Distinct Vision p.310
35. Locating Rods and Cones p.311
36. Range of Color Vision p.312
37. Afterimages p.313
38. Persistence of Vision p.314
39. Blended Images p.314
40. Moving Pictures p.315
41. Binocular Vision p.316
42. Nearby and Distant Objects p.316
43. Judging Distance p.317
44. Stereoscopic Vision p.317
45. Sharpness of Hearing p.320
46. Binaural Listening p.321
47. Taste Buds p.324
48. Mapping the Tongue p.325
49. Identifying Odors p.326
50. Sense of Balance p.327
51. Senses in the Skin p.328
52. Finger Tips p.329
53. Senses of Heat and Cold p.329
54. Blind Spot, #4, p.332
55. Taste Testing, #5, p.332
56. Color Effect on Eyes, #6, p.332
57. Color Vision, #7, p.332
58. The Sighting Eye, #10, p.333
59. Organs of Balance, #11, p.333
60. Fatigue and the Taste Buds, #12, p.333
61. Colorblindness, #14, p.333
62. Moving Picture Principle, #8, p.334

Thurber, Kilburn, and Seager. Exploring the Sciences Record Book: (Lab Manual) Boston: Allyn and Bacon, 1970.

63. Vision Experiments, pp.155-163
64. Hearing Experiments, pp.164-165
65. Taste and Smell Experiments, pp.166-167
66. Sense of Balance, p.168
67. Sense of Touch, Heat, and Cold, p.169
68. Additional Senses, p.170
69. External and Internal Stimuli, p.175
70. Nervous System, pp.176-177
71. Spinal Cord/Reflexes, p.178
72. Brain, p.179

Oxenhorn and Idelson. Pathways in Science. Biology 2
New York: Globe, 1968.

73. What do We See in the Dark?, p.145
74. What is the Color of the Eyes?, p.145
75. What is the Job of the Pupil?, p.145
76. Which Parts of the Tongue Taste What?, p.148
77. How do You Locate Sense Spots on the Skin?, p.148
78. Dissection of Chicken Heads, #2, p.155

Science Lab: 7 and 8, Curriculum Bulletin.
Dade County Board of Public Instruction

79. Reflex Actions, pp.118-119
80. The Eye, p.120
81. How We See, pp.121-122
82. Optical Illusions, pp.124-125
83. How We Taste, pp.126-127
84. Smell, pp.128-130

Biology, Curriculum Bulletin 8F, Tentative.
Dade County Public Schools

85. The Senses
    a. Minimal or Threshold Stimulus p.189
    b. Balance and Sight p.190
    c. Taste p.190
    d. Threshold of Sound p.191
    e. Space Perception p.192
    f. Exhaustion of Olfactory Nerves p.192
    g. Pupil of the Eye p.193
    h. Reflexes p.193

MacCracken et al, Life Science.
New York: Singer, 1968.

86. Sense Organs p.163
87. How Much Do Animals Eat? p.166

Biological Sciences Curriculum Study Committee. Molecules to Man (Blue Version). 2nd ed. New York: Houghton Mifflin Co., 1968.

88. Investigating the Eye (Inv. 23-3, pp.584-586)

DEMONSTRATIONS

Otto, Towle, Crider. Teachers Guide to the Modern Biology Program.
New York: Holt, Rinehart, and Winston, 1965.

1. Spinal Reflex Action (Inv. 44-1, Part 2, p.257)
2. Pupil Reflex (Inv. 44, Part 3, p.257)
3. Visual Accommodation (Inv. 44-4, p.260)

Lesser. Life Science (Intermediate Level).
New York: Amsco Publications, 1967.

4. Reactions of a Frog, pp.121-122

Thurber, Walter, and Kilburn. Exploring Life Science.
Boston: Allyn and Bacon, Inc., 1970.

5. Reflexes of a Frog, #5, p.364
6. Fatigue the Organ of Smell, #16, p.335
7. Fatigue Color Vision, #17, p.335

PROJECTS

Frazier and Smith. The Biological Sciences.
Illinois: Laidlaw Brothers, 1969.

1. Do It Yourself: Clay Model of Skin, p.282
2. Do It Yourself: Clay Model of Brain, p.327
3. Some Things to Do: Research Cranial Nerves, #1, p.341

Thurber and Kilburn. Exploring Life Science.
Boston: Allyn and Bacon, 1970.

4. Investigating Reflexes of Pets, #13, p.365
5. Dissect Assorted Animal Skulls, #7, p.366

Original - Have Students:

6. Build a depth perception machine out of wood for use in class. (Research the plans for this in your school library)
7. Pretend to be "Blind" by blindfolding themselves for a short period of time and trying to continue normal activities. Report experiences to the class. (Several variations of this idea can be adapted)
8. Pretend to be "Deaf" by carefully placing cotton in their ears for a short period of time and carrying on normal activities. Report experiences to class.
9. Pretend to have "Lost your sense of Touch" by wearing heavy gloves. Report experiences.
10. Build a machine with which to demonstrate the primary colors of light, and blend them to show the effect. (Research the construction of this in your school library.)

PROJECTS (continued)

11. Investigate the principle of Braille. Construct some samples. Demonstrate its use.
12. Research Extra Sensory Perception. Re-create some of the tests used by research scientists. Try them out on the class.
13. Devise an original experiment related to one of the sense organs. Perform it in class.
14. Prepare a detailed paper about any one of the senses, relating the sense to all the systems of the body. Include a bibliography.

REPORTS

1. Compare the sense of smell in dogs to man; the sense of sight in birds to man.

2. Using sketches, compare the eyes of different kinds of animals.

3. How do bats manage so well in the dark?

4. Hearing aids: their history and development.

5. The electroencephalograph and how it is used to interpret brain patterns.

6. Diseases of the eye.

7. The sonar-like mechanism of the porpoise.

8. The sense of smell in various animals, birds, fish, butterflies, lobsters, squids.

9. The taste mechanisms in various animals, birds, fish, grasshoppers, crabs.

10. Parapsychology.

DADE COUNTY 16 mm. FILMS

1. Nervous System
   AV#1-03152, 11', BW

2. Eyes: Their Structure and Care
   AV#1-03513, 11', C

3. Eyes and Their Care
   AV#1-03141, 11', BW

4. Visual Perception
   AV#1-04289, 10', BW

5. Optical Illusions
   AV#1-01860, 10', BW

6. Ears: Their Structure and Care
   AV#1-0307[illegible], 10', BW

7. Ears and Hearing
   AV#1-03067, 10', BW

8. Sound
   AV#1-01837, 10', BW

9. Nose, The (Structure and Function)
   AV#1-03112, 11', BW

10. Learning About Your Nose
    AV#1-03107, 9', C

11. Healthy Skin
    AV#1-03139, 11', C

12. Gateways to the Mind (Part I)
    AV#1-30718, 30', C

13. Gateways to the Mind (Part II)
    AV#1-30719, 30', C

14. Sense Perception (The limitations of the Senses) Part 2
    AV#1-30025, 28', C

15. Sense Perception (The Wonders of the Senses) Part 1
    AV#1-30024, 27', C

DISCUSSION QUESTIONS

1. How do your senses keep you aware of your environment?

2. Which is more sensitive: the sense of smell or the sense of touch? Why?

3. In what way is the nervous system comparable to a telephone operator connecting two parties?

4. What is meant by reaction time?

5. Why is the nervous system both a periscope and an intercom system?

6. How many senses do we really have?

7. At night you can see distant, dim stars better if you do not look directly at them. Why?

8. If man is isolated from the sights, sounds and touch of his world, what happens to him?

9. Many of us go through life unaware of the great range of our senses. Why?

10. In outer space, there is no gravity to tell us when we are up or down. How does man react in this environment? What would be the results of prolonged living without gravity?

11. Why is it easy to deceive the eye?

12. Explain why you chew gum before take-offs and landings in an airplane.

13. Why are the sense organs in the hand extremely sensitive?

14. Why can an infection in the middle ear cause temporary deafness?

15. Why are the sense organs called, "reporters of the outside world"?

16. What are the mechanics of the knee reflex?

17. Why can it be said that the eye makes two simultaneous pictures; one in color, and one in black and white?

18. Taste is the least informative of our senses. Why? To overcome this, on what senses do we rely for help?

DISCUSSION QUESTIONS (continued)

19. An acrobat walking a tightrope doesn't fall. Why? What senses are involved?

20. The most cruelly handicapped are the totally blind and deaf. Why?

21. What sense would you consider the least important? Why?

ADDITIONAL ACTIVITIES

Make labeled drawings of .....
1. The Brain
2. The Eye
3. The Ear
4. The Nose
5. The Skin
6. Sensory, Conductor, Effector neurons
7. A Reflex Arc

Brandes. An Introduction to Optical Illusions.
Portland, Maine: J. Weston Walch, 1956.

8. Using the above as a guide, make several of your own original optical illusions.

Interchem. The Color Tree.
New York: Interchemical Corporation, 1965.

9. Use the above booklet for testing color perception, and visual acuity. (The student can perform the simple tests on himself as he reads the booklet.)

10. Make fingerprints of your hand. Compare them to the rest of the class - noting similarities and differences. Can you recognize any that have had damage done to the fingertips? If so, what might be true of their sense of touch?

11. Using the Ishihara booklet, test yourself for colorblindness.

12. Test your color perception by describing 30 different skeins of embroidery yarn. Use the words light, medium, dark .. to describe the varying shades of any particular color.

13. For additional information about the Nervous System and the Senses, refer to the Time-Life Books called The Mind and The Body. These books have excellent diagrams, explanation, and experimental information that will enable you to give more depth to your discussions.

REFERENCES

1. Biological Sciences Curriculum Study Committee. Biological Science: Molecules to Man (Blue Version), 2nd Ed. New York: Houghton Mifflin Co., 1968.

2. Brandwein, Paul F. et al. The World of Living Things. New York: Harcourt, Brace, and World, 1964.

3. Frazier, Ralph and Smith, Herbert. The Biological Sciences. Illinois: Laidlaw Brothers, 1969.

4. Lesser, Milton. Life Science (Intermediate Level). New York: Amsco Publications, 1967.

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7. Otto, Towle, Crider, Elizabeth. Teachers Guide to the Modern Biology Program. New York: Holt, Rinehart and Winston, 1965.

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11. Brandes. Introduction to Optical Illusions. Portland, Maine: J. Weston Walch, 1958.

12. Dade County Public Schools. Biology Curriculum Bulletin 8F.

13. Dade County Public Schools. Science Lab: 7 & 8.

14. Interchem. The Color Tree. Interchemical Corporation, 1968.

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MASTER SHEET - MAN'S SENSES

Objectives	Experiments	Demonstrations	Projects	Reports	Films	Discussion Questions	Additional Activities
1	1, 11, 14, 24, 25, 26, 71, 78, 68, 69, 79, 85a, 85h	1, 4, 5	2, 3, 4, 5	5	1, 12, 13, 14, 15	3, 4, 5, 16	1, 6, 7
2	7, 16, 32, 35, 63, 73, 74, 75, 80, 81, 88		13	2	2, 3, 13, 14, 15	17	2
3	6, 8, 15, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41 42, 43, 44, 54, 56, 57, 58, 61, 63, 73, 82, 85g	2, 3, 7	6, 7, 10, 11, 13, 14	3, 4	4, 5, 12, 13, 14, 15	7, 11, 20	11, 12
4	4, 17, 23, 85		13	4	6, 7, 12, 13, 14, 15	12, 14	3
5	17, 23		8, 14	7	8, 12, 13, 14, 15	20	
6	5, 12, 59, 66, 85b		13, 14		12, 13, 14, 15	10, 19	
7	2, 20, 49, 65 84, 85f	6	13, 14	8	9, 10, 12, 13, 14, 15		4
8	13, 19, 47, 48, 60, 65, 76, 83, 85c		13, 14	1, 9	11, 12, 13, 14, 15	8	
9	3, 9, 10, 18, 22, 51, 52, 53, 67, 77, 85		1, 9, 11, 14			13	5, 10
10	68, 87		12	10	12, 13		

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

INTRODUCTION TO THE HUMAN BODY

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5312.20
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SCIENCE
(Experimental)

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1971

INTRODUCTION TO THE HUMAN BODY

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SCIENCE
(Experimental)

Written by: Morton Raisen

for the

DIVISION OF INSTRUCTION
Dade County Public Schools
Miami, Florida
1971

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Published by the Dade County School Board

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Textbook Services
2210 S. W. Third Street
Miami, Florida 33135

Price: $.75

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INTRODUCTION TO THE HUMAN BODY

COURSE DESCRIPTION

This is a survey course of the systems of the human body and their functions, based on the concept of their interdependence and interaction as related to the entire organism. An activity course presenting the more sophisticated concepts through laboratory demonstrations.

ENROLLMENT GUIDELINES

None.

STATE ADOPTED TEXTS

1. Brandwein, Paul, et al. Life its Forms and Changes. New York: Harcourt, Brace and World, 1968.

2. Frazier, Ralph and Smith, Herbert A. The Biological Sciences: Investigating Man's Environment. River Forest, Illinois: Laidlaw Brothers, 1969.

3. Oxenhorn, J. M. Pathways in Science - Biology Vol. I, II and III, New York: Globe Book Company, 1969.

4. Thurber, W. A., and Kilburn, R. E. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1970.

5. Wong, Harry K. and Dolmatz, Malvin S. Ideas and Investigations in Science: Biology. Englewood Cliffs, New Jersey: Prentice - Hall, 1971.

PERFORMANCE OBJECTIVES

The student will:

1. List ten life functions that all cells must carry on to survive.

2. Give examples showing the relationship of bone structure and function.

3. Give the four major types of bone articulations with at least one example and the specific description of each.

4. Discriminate between three classifications of muscles as to structure and function.

5. Delineate among the following factors of physiology of muscle contraction: tone, excitation, contraction and relaxation.

6. Describe the basic structure and function of the neuron.

8. Explain the function of the three main parts of the human brain and the significance of each part.

9. Given a visual model of the human eye, identify the main structures and their functions.

10. Trace the paths of nerve impulses from sense organs to brain interpretation.

11. List the main constituents of blood and the general functions of each.

12. List the major blood groups, RH factors, and the consequences of blood transfusions.

13. Trace the pulmonary circulation of blood.

14. Trace the systemic circulation of blood.

15. Describe the composition and interrelationship of the circulatory, lymphatic, and intracellular transport systems.

16. Explain cardiac function and control.

17. Trace the pathway of gas exchange in the lungs.

18. List the major structures and functions of the alimentary canal.

19. Describe the role of the major digestive enzymes and their activation.

20. List the major structures and functions of the excretory organs.

21. List the major structures and functions of the urogenital system.

22. List the major structures and functions of the endocrine system.

23. Cite evidence of hormones secretions in teenage development, and common endocrine disorders.

COURSE OUTLINE

I. Foundation

A. Cell - structure and needs

B. Groups of similar cells - tissue

C. Organs - combinations of tissues

D. Systems - organs functioning together to perform each body need

II. Skeletal System

A. Structure and function of specialized cells

B. Chemical make-up of skeleton

C. Types of bones and joints

D. Functions of bones

1. Marrow
2. Body shape
3. Posture

F. Malfunctions - congenital and acquired

III. Muscular System

A. Structure of muscle fiber

B. Voluntary and involuntary muscles

C. Exercise - fatigue, chemical changes, muscle tone

D. Cardiac muscle - structure and care

E. Malfunctions

IV. Nervous System

A. Neuron structure

B. Physiological changes

C. Reflex

D. Brain

E. Learned behavior

F. Ear

G. Eye

H. What effects transmission across a synapse

I. Malfunctions

J. Effects of Drugs

V. Circulatory System

A. Blood - purpose, components, importance

1. White and red cells
2. Plasma

B. Vessels - structure and function

C. Heart - unique structure

D. Complete journey of a drop of blood

E. Importance of normal blood pressure

F. Abnormalities

G. Blood typing - importance in matching

VI. Respiratory System

A. Structures and mechanics

B. Role of blood

C. Oxidation

D. Abnormalities

VII. Digestive System

A. Enzymes

B. Tooth structure and kinds of teeth

1. Care of teeth
2. Mastication

C. Organs

D. Assimilation

E. Abnormalities

F. Nutrition

1. Balanced diet
2. Vitamin deficiencies

VIII. Excretory System and Integumentary System

A. Organs of excretion maintain homeostasis

B. Abnormalities, disease, injuries

IX. Endocrine System

A. Structure - ductless

B. Function - secretion, hormone production

C. Varied growth patterns in teenagers

X. Reproductive System

SUGGESTED ACTIVITIES

Skeletal system

1. Assembly of skeleton of small animal
2. Biomechanic comparison--arch of foot to bridge, vertebral column to mast of ship, etc.
3. Examination of bone types from local meat cutter.

Muscular system

1. Microscopic examination of muscle tissue of cells
2. Muscle fatigue of gastrocnemius
3. Corrective exercise

Nervous system

1. Babinski reflex
2. Threshold stimuli
3. Response time

Circulatory system

1. Pulse rate under varied conditions
2. Blood pressure under varied conditions
3. Blood typing
4. Visit by doctor for technician with EKG

Respiratory system

1. Measurement of lung capacity by water displacement
2. Bouyancy of lung

Digestive system

1. Starch test on salivated bread
2. HCL and enzyme (papaya)

Excretory system

1. Microscopic examination of the glomerulus from a goldfish

Reproduction and Endocrine system

1. 1-5 day development of a chick embryo
2. Juvenile hormone on tadpole
3. Effect of Adrenalin on a frog heart
4. Effect of Acetylcholine on a frog heart

EXPERIMENTS

Oxenhorn and Idelson. Pathways in Science, Vol. 1. New York: Globe Book Co., 1968.

1. Getting the work done inside a cell (osmosis) (p. 97)
2. Can salt pass through a membrane? (p. 101)
3. What makes bones hard and strong? (p. 103)
4. Breathing in plants and animals (p. 127)
5. Is it starch? (p.142)
6. Is it sugar? (p.143)
7. Is it protein? (p. 144)
8. Is it vitamin C? (p.145)
9. Is it mineral? (p. 145)
10. Is it water? (p. 146)
11. How many calories? (p. 156)

Oxenhorn and Idelson. Pathways in Science, Vol. 2. New York: Globe Book Co., 1969.

12. Will all materials pass through a membrane? (p. 20)
13. How does saliva digest starch? (p. 35)
14. How does gastric juice digest protein? (p. 40)
15. How does bile emulsify fats? (p. 45)
16. What does breathing do to the chest cavity? (p. 80)
17. Bubble O_2 & CO_2 through outdated blood, (p. 81)
18. Do we exhale carbon dioxide? (p. 82)
19. How much air do you take in when you breath? (p. 85)
20. Testing urine for glucose. (p. 91)
21. Proof that there is more carbon dioxide in exhaled air. (p. 93)

22. What is the cooling action of the skin? (p. 94)

23. What do we see in the dark? (p. 145)

24. What is the job of the pupils? (p. 145)

25. Which parts of the tongue taste what? (p. 148)

26. How can we locate sense spots on the skin? (p. 153)

Brandwein, et al. The World of Living Things. New York: Harcourt, Brace & World, Inc., 1964.

27. How tendons work. (p. 271)

28. Demonstrating the action of muscles. (p. 277)

29. Test for fat. (p.288)

30. Body temperature and exercise. (p. 301)

31. Enzymes in saliva. (p. 307)

32. Pulse rate and exercise. (p. 314)

33. Knee reflex. (p. 322)

34. Eye reflex. (p. 326)

35. Eye pupil reflex. (p. 327)

36. How you hear. (p. 328)

37. Sense of taste. (p. 330)

38. Difference in skin sensitivity. (p. 330)

39. Taste, smell, flavor. (p. 331)

40. Eyes and environment. (p. 340)

DEMONSTRATIONS

1. Observation of blood in capillaries of a frog's foot.

2. Obtain a pig or beef heart untrimmed to study chambers and valves.

3. Remove freshly killed frog's heart and place it into a weak saline solution and study heart beats.

4. Compare fresh slides of the frog's blood and human blood.

5. Obtain a large bone from butcher cut lengthwise to study various parts of the bone.

6. Bring animal bones to class to show different kinds of joints. Have students make drawings of various kinds of joints and list place in the body where specific joints occur.

7. Demonstrate binocular vision and blind spot location.

Phipps and Bird ed. A Physiology Manual for the Biology Teacher. Richmond, Virginia: Phipps and Bird Inc., 1963.

8. Respiratory Patterns (Ex. 1, p. 5)

9. Effect of Exercises (Ex. 2, p. 7)

10. Sensory Stimuli--Effecting Respiratory Movements (Ex. 3, p. 9)

11. Breath Holding Time (Ex. 4, p. 11)

12. Role of Carbon Dioxide (Ex. 5, p. 13)

13. Vital Capacity (Ex. 5, p. 15)

14. Muscle Twitch (Ex. 1, p. 19)

15. Muscle Response (Ex. 21 & 23, pp. 21-23)

16. Work Performed by Muscle (Ex. 4, p. 25)

17. Muscle Fatigue (Ex. 5, p. 27)

18. Recording Heart Beat (Ex. 7, p. 31)

19. Effect of Temperature on Heart Rate (Ex. 2, p. 23)

20. Refractory Period of the Heart (Ex. 3, p. 37)

21. All or None Response (Ex. 4, p. 39)

22. Vagal Inhibition of Heart Beat (Ex. 5, p. 41)

Filledes. Experimental Physiology and Applied Biology. Cambridge, Massachusetts: Educators Publishing Service, 1967.

23. Human Heart Sound (Ex. 2, p. 11)

24. Pulse Rate (Ex. 4, p. 15)

25. Blood Pressure (Ex. 5, p. 17)

26. Drawing a Sample of Blood (Ex. 7, p. 25)

27. Blood Smear (Ex. 8, p. 27)

28. Observing RBC and WBC (Ex. 10 and 11, pp. 29-31)

29. Hemoglobin Level of Blood (Ex. 11, p. 33)

30. Blood Typing (Ex. 14, p. 39)

31. Red Blood & White Blood Count (Ex. 17 and 18, pp. 51&53)

32. Screening Test for Noraml Urine Contents (Ex. 19, p. 57)

33. The Clinical Thermometer (Ex. 23, p. 67)

PROJECTS

Morrison, T. F.; Cornet, F. D.; Tether, J. E. Human Physiology. New York: Holt, Rinehart and Winston, Inc., 1963.

1. Chart on anatomical terms (p. 7)
2. Molecular Structures of Life. (p. 19)
3. Cell division - Mitosis (p. 27)
4. Construct models of epithelial cells (p. 38)
5. Internal structures of fresh bone (p. 61)
6. Mount the skeleton of a small animal. (p. 61)
7. Organic and inorganic properties of bone. (p. 61)
8. Chart muscles size and strength (p. 72)
9. Chart effect of exercise on heart and respiratory rate (p. 72)
10. Corrective exercises for fallen arches (p. 80)
11. Number of color-blind students. (p. 140)
12. Determine peripheral vision (p. 140)
13. Monocular vs. binocular vision (p. 140)
14. Demonstrate optical illusions (p. 140)
15. Demonstrate spherical and chromatic aberrations (p.140)
16. Devise an experiment to determine extent of deafness (p. 152)
17. Fresh stomach wall and its enzymes (p. 200)
18. Dissect a beef or lamb heart (p. 291)
19. Identify heart sounds with a stethoscope (p. 291 and 306)
20. Chart age and heart rate (p. 291)
21. Chart variation in daily body temperature (p. 324)
22. Dissect a lamb kidney (p. 342)

REPORTS

Morrison, T. F.; Cornett, F. D.; Tether, J. E. Human Physiology. New York: Holt, Rinehart and Winston, Inc., 1963.

1. Reports on men in the science of physiology (p. 7)
2. Effects of radiation of bone growth (p. 61)
3. First aid treatment for bone injuries (p. 61)
4. Vocational opportunities in neurology (p. 93)
5. Classify 25 activities as simple, conditioned or learned (p. 114)
6. How do you develop and break habits? (p. 114)
7. Report on the theories of color vision (p. 140)
8. Prepare a report on the prevalence of deafness (p. 152)
9. Dietary problems of space travel (p. 167)
10. What happens to vitamins after they have been used? (p. 182)
11. Tooth structure and general diet (p. 191)
12. Correction of malocclusion (p. 191)
13. Dr. William Beaumont (window in stomach) (p. 200)
14. Pavlov's mechanism of secretion in the stomach (p. 200)
15. Trace the development of the blood flow theory (p. 255)
16. Prepare a report on blood disorders (p. 255)
17. Report on E. K. G. and its meaning (p. 291)
18. Report of heat cramps and heat exhaustion (p. 324)

FIELD TRIPS

1. Visit a rescue squad of a local fire department.
2. Visit a hospital clinical lab.
3. Visit the University of Miami Medical School.
4. Visit a dental office.

DISCUSSION QUESTIONS

1. Why are adrenal glands referred to as emergency glands?
2. What are some superstitious beliefs about food such as "fish is a brain food"? How do you think these superstitions started?
3. Why do we need more food on cold days than warm days?
4. What would be missing from a meal consisting of a frankfurter on roll and a bottle of soda?
5. How true is the expression, "Like father, like son"?
6. How true is the expression, "You can't teach an old dog new tricks"?
7. Describe the steps in training a puppy to answer to his name.
8. What is meant by I.Q.? What do I.Q. tests attempt to measure?
9. Look in newspapers and magazines, and collect collect colorful examples of human behavior and discuss.
10. Observe and discuss how children learn the following (a) catching a ball (b) building with blocks (c) putting together a simple puzzle (d) tying a shoelace.
11. Considering the alleged effects on the human body from marijuana, should it be legalized?
12. What effects will automation or the "computer age" have on the human body?
13. Will computers ever replace the human?
14. What physical and personality qualifications might be necessary to qualify for the astronaut or nuclear submarine program.
15. What is your plan to solve the over-population problem?
16. Why did the study of the human body have such a "stormy passage" historically?

DADE COUNTY 16MM FILMS

1.	Eyes: Their Structure and Care	11'C	AV#1-03513
2.	Healthy Lungs	10'C	AV#1-03058
3.	Muscles and Bones of the Body	11'C	AV#1-03138
4.	Circulation: Why and How	10'C	AV#1-03089
5.	Defense Against Invasion	15'C	AV#1-11297
6.	DNA: Molecule of Heredity	16'C	AV#1-11078
7.	Exploring Your Growth	11'C	AV#1-13123
8.	Gateways to the Mind (Part I)	30'C	AV#1-30718
9.	Gateways to the Mind (Part II)	30'C	AV#1-30719
10.	Hemo the Magnificent (Part I)	35'C	AV#1-40027
11.	Hemo the Magnificent (Part II)	35'C	AV#1-40032
12.	Human Body: Digestive System	13'C	AV#1-11240
13.	Human Body: Excretory System	13'C	AV#1-11214
14.	Human Body: Nervous System	14'C	AV#1-11277
15.	Human Body: Reproductive System	16'C	AV#1-11249
16.	Human Body: Respiratory System	13'C	AV#1-11211
17.	Human Body: Skeleton	10'BW	AV#1-03050
18.	Human Machine	14'C	AV#1-11215
19.	Principles of Endocrine Activity	16'C	AV#1-11213
20.	Thread of Life (Part I)	30'C	AV#1-30568
21.	Thread of Life (Part II)	30'C	AV#1-30570
22.	Chick Embryo: From Primitive Streak to Hatching	13'C	AV#1-11518

REFERENCES

1. Brandwein, Paul F. et al. Life its Forms and Changes. New York: Harcourt, Brace & World, 1968.

2. Brandwein, P. F.; Beck, A. D.; Violet, S.; Leland, G. H.; Matthew, J. B. The World of Living Things. New York: Harcourt, Brace & World, Inc., 1964.

3. Dodge, R. A. Elements of Biology. Boston: Allyn and Bacon, Inc., 1959.

4. Frazier, Ralph and Smith, Herbert A. The Biological Sciences: Investigating Man's Environment. River Forest, Illinois: Laidlaw Brothers, 1969.

5. Mason, J. M. and Peters, R. T. Life Science, A Modern Course. Princeton, New Jersey, 1965.

6. Morrison, T. F.; Cornett, F. D.; Tether, J. E. Human Physiology. New York: Holt, Rinehart and Winston, 1963. Also Lab Book.

7. Thurber, W. A. and Kilburn, R. E. Exploring Life Science. Boston: Allyn and Bacon, Inc., 1970.

8. Oxenhorn, J. M. Pathways in Science Vol. I, II, & III. Biology New York: Globe Books Company, 1969, 1970.

9. Wong, Harry K. and Dolmatz, Malvin S. Ideas and Investigations in Science, Biology. Englewood Cliffs, New Jersey: Prentice Hall, 1971.

MASTER SHEET - INTRODUCTION TO THE HUMAN BODY

Objectives	Experiments	Demonstrations	Projects	Reports	Field Trips	Discussion Questions	Films
1	1, 2, 4, 12	11	2, 3, 4	1, 15, 16	2, 3		5
2	3, 9	6	5, 6, 7, 10	2, 3, 10, 11, 12	2, 4		17
3	27	5, 6	6, 10	2, 3, 10, 11, 12	2, 3		3, 17
4	27, 28	2, 3, 17, 23	8	1, 5, 10, 18	2	1, 3, 12, 13	3
5	27, 28	14-17, 23	8	1, 5, 10, 18	2	1, 3, 12, 13	3
6		14, 15, 21, 22		1, 4, 5, 6, 8, 10, 14, 17	2	1, 6, 7, 8, 10, 11, 12, 14	1, 7, 8, 9, 14, 18
7	33-40	14, 17	11-16	4-6	2	1, 6-12, 14	1,8,9,14, 18
8	33-40	17, 16	11-16	4, 14	2, 3	1, 2, 6-12, 14	8, 9, 14, 18
9	34, 35, 40	7	11-13	7, 10		9, 11, 14	1, 8, 9,18
10	36-39		16	4, 5, 6	2	1, 3, 6, 10, 14	8, 9, 14, 18
11	17	25-31		2, 10, 14-18	2, 3	1, 3	4, 5, 10, 11, 22
12		30		15, 16	2, 3		4,10,11
13		2-4,18-22	18	15, 16, 17	2, 3	9, 14	4,10,11,22
14		2-4,18-22	18	15-17	2, 3	9, 14	4,10,11,22
15	17, 32	23-25	18-20	15-17	2, 3	3, 11	4,10,11,22
16	17, 32	23-25	18-20	15-17	2, 3	9	2, 4, 10, 11, 22
17	4, 18, 19, 21	8-13	9	17	1	14	2, 4, 16, 18
18	5-10		17	9, 10		14	13
19	5-10		17	9-11, 13, 14		2, 3, 4, 14, 15	12, 18
20	11,18,21	32		18		14	13
21			22		2	3, 14	13
22				13, 14		1, 9	7, 19
23				13, 14		1, 9	7, 19